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AUTHOR Roweton, William E.; Spencer, Herbert L., Jr.
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ABSTRACT

Numerous studies of verbal creativity indicate that idea originality increases progressively as more ideas are produced. The present study tested the effects of practice upon nonverbal creativity. Thirty-two fifth grade children were administered Form A and/or Form B of Torrance's picture completion task for 5 consecutive days. Figural originality increased with practice only on certain task items and, overall, only on Form A. Results were traceable to differences inherent in the alternate forms of the test, peculiarities of task items, amount of practice, and so on. Apparently, extended effort did not indiscriminately enhance figural originality in nonverbal creative problem solving. (Author)

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Facilitative Effects of Practice upon Nonverbal Creativity

William E. Roweton and Herbert L. Spencer, Jr.

Indiana State University

Numerous creativity training programs (Davis & Houtman, 1969), texts (Osborn, 1963), and experiments (Christensen, Guilford, & Wilson, 1957; Parnes, 1959, 1961; Parnes & Meadow, 1959) postulate an inseparable relationship between creative idea quality and idea production. To quote Osborn (1963, p. 130): "It is almost axiomatic that quantity breeds quality in ideation. Logic and mathematics are on the side of the truth that the more ideas we produce, the more likely we are to think up some that are good. Likewise it is true that the best ideas seldom come first."

Parnes (Exp. I, 1961) had college Ss list unusual uses for a coat hanger for five min. Responses were arranged in their order of emission, and the creative idea quality (rated practicality and uniqueness) of the first and the second half of the lists was compared. Over all, ideas in the second half of the lists were more creative. In a similar experiment (Parnes, Exp. II, 1961), Ss trained in brainstorming generated unusual uses in the hanger problem for 15 min. Ideas produced in the last five min. were the most creative.

Evidence unmistakably indicates that idea production facilitates idea originality (e.g., Davis, Roweton, Train, Warren, & Houtman, 1969; Freiheit, 1969; Ward, 1969). However, most investigators, with the principal exception of Freiheit (1969), have employed only verbal tasks. The present study further tested the effects of extended effort using nonverbal creativity tasks.

Method

Subjects.--Thirty-two fifth grade (16 females, 16 males) children participated.

Procedures.--Four boys and four girls were randomly assigned to each of four treatment groups. One groups was administered Form A of Torrance's picture completion task for five consecutive days. Another group received Form B of the

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picture completion task for five days. The third group received Form A for three days and then Form B for two days, and the last group was given Form B for three days and Form A for the last two days. In the picture completion task, Ss complete 10 abstract but relatively simple line drawings in 10 min.

Responses were scored for fluency, flexibility, elaboration, originality, and total score (creativity) according to Torrance's (1966) standardized instructions.

Results

A repeated measures 2 X 2 X 5 (sex by test halves by days) analysis of variance was employed on each five dependent measures. Results indicated that fifth grade girls are significantly more flexible than fifth grade boys ($F(1,30)=8.14$, $p<.01$), although females generated drawings significantly less elaborate ($F(1,30)=9.69$, $p<.01$). Ss were more flexible on the first half than on the second half of the tests ($F(1,30)=104.32$, $p<.01$). Also, the days main effect on flexibility reached significance ($F(4,120)=3.07$, $p<.05$). On a subsequent Newman-Keuls test, flexibility on day 1 was significantly less than on day 4 ($q=.447$, $df=120$, $p<.05$); flexibility scores increased steadily on successive days. On the total score, males were more creative than females ($F(1,30)=4.20$, $p<.05$). However, the overall analysis on originality and creativity did not reveal any substantial performance change from one testing session to the next.

A subsequent 2 X 5 (Forms A, B by days) repeated measures analysis of variance on those Ss receiving only Forms A or B indicated that the days main effect on originality reached significance ($F(4,56)=3.70$, $p<.01$). A subsequent Newman-Keuls test indicated that performance on day 5 was significantly more original than on day 1 ($q=2.88$, $df=56$, $p<.01$); originality increased steadily across successive days. A days X form interaction on originality also reached significance ($F(4,56)=3.80$, $p<.01$). Results from a subsequent Scheffe Multiple F-test indicated that differences in originality between Forms A and B were

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significantly greater on days 4 and 5 than on days 1, 2, or 3. Subsequent Newman-Keuls tests indicated that, on Form A, originality on day 5 was significantly greater than on day 1 (q=2.25, df=56, $p < .05$), day 2 (q=2.19, df=56, $p < .05$), or day 3 (q=2.13, df=56, $p < .05$); furthermore, originality on day 4 was significantly higher than on day 1 (q=2.19, df=56, $p < .05$) or day 2 (q=2.13, df=56, $p < .05$). No pair-wise comparison on Form B was significant.

Discussion and Conclusions

Present results on originality clearly question earlier studies. First, neither originality nor creativity (total score) significantly increased on the second half of the tests; Parnes (1961), Davis et al., and Ward (1969) clearly demonstrated that responses were markedly more original as problem solving progressed. Second, Freiheit (1969) found that figural originality substantially improved upon the second presentation of Torrance's nonverbal tasks. Combining Forms A and B, we found that figural originality increased significantly only after 50 min. of problem solving (i.e., the fifth day). However, Freiheit's originality measure was based on all three of Torrance's figural subtests; with only two testing sessions, the incomplete figures task may have contributed relatively little to Freiheit's effect.

Tradition maintains that (1) alternate forms of Torrance's tests are equivalent and (2) "The simple practice-effects of taking the tests do not seem to have a great deal of effect on performance . . ." (Torrance, 1966, p. 76). Neither statement was empirically substantiated. In sharp contrast to Form B, originality levels in the picture completion task in Form A improved consistently across the five testing sessions, a result similar to Mednick's (1962) findings that verbal responses become increasingly unique as more responses are emitted. Furthermore, it is unmistakably clear that originality performance on the alternate forms of the picture completion task was substantially different

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especially on the fourth and fifth days. By implication, the present results are traceable to task-item peculiarities inherent within each form. An item by item assessment was made on mean originality on days 1 through 3 as compared to days 4 and 5. In Form A, all items except one increased in originality while in Form B only one half of the items increased at all over the first and second portions of the testing week. Perhaps, many of the simple line drawings in Form B readily suggested very common nonverbal responses.

The facilitation of originality through additional problem solving effort represents a stable finding in verbal creativity literature. This effect persists across tasks and scoring criterion procedures: For instance, Parnes and Ward employed the unusual uses task while Davis et al. administered a product improvement problem; furthermore, Davis et al. and Parnes assessed originality with judges' ratings while Ward tabulated response frequencies. Osborn's contention that "quantity breeds quality" is not simply and universally applicable to nonverbal creativity. The degree of originality facilitation through practice depends upon the nature of the task (verbal, nonverbal), peculiarities inherent to the task items, and the amount of problem solving time.

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